

REMARKS

In accordance with the foregoing, claims 1 and 3-15 are pending and under consideration.

CLAIM REJECTIONS UNDER 35 U.S.C. §101

In the outstanding Office Action, claims 1 and 3-15 are rejected under 35 U.S.C. §101 being alleged that the claimed invention is directed to non-statutory subject matter. The statutory categories of inventions as defined in 35 U.S.C. §101 are “process, machine, manufacture and composition of matter.” Independent claim 1 as well as dependent claims 3-10, and independent claim 14 are directed to methods of generating mesh data. Independent claim 15 is directed to a method of thermal fluid analysis of a target object by generating mesh data. Methods are processes and, therefore, statutory subject matter. In fact, the Examiner admits (likely referring to claim 1) that the claimed invention “represents nothing more than a process...”. Independent claim 13 is directed to an apparatus, which is a machine, and, therefore, statutory subject matter. Independent claims 11 and 12, which are consistent with acceptable claim format¹, are considered as directed to manufacture (the computer readable media), and, therefore, a statutory subject matter.

Further on page 2 of the outstanding Office Action, it is asserted that the claimed inventions fail to produce a tangible result. However, the “tangible result” test should be applied only when the claimed subject matter belongs to a non-statutory category², such as an algorithm, a law of nature or a formula³. As discussed above, the claims of the present application are directed to statutory categories. Even if *arguendo* one applies the “tangible result” test, the preamble of the claims makes it clear that the method/apparatus/etc. generate mesh data, which is a concrete result.

In view of the above arguments, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. §101.

CLAIM OBJECTIONS

Claims 4-8 are objected to under 37 C.F.R. 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants traverse the

¹ See *In re Lowry*, 32 F.3d 1579, 32 U.S.P.Q.2d 1031 (Fed. Cir. 1994), in which the Federal Circuit held that a data structure in a computer memory was statutory (patentable) subject matter.

² See, for example, www.uspto.gov/go/og/2005/week47/patgupa.htm.

³ See *State Street Bank & Trust Company v. Signature Financial Group*, 1998 U.S. App. LEXIS 16869.

claim objections because the claims are narrower than the independent claim from which they depend. Independent claim 1 recites

reducing the cube elements in number by combining the cube elements in accordance with a second condition selected from a group of second conditions consisting of preventing a change of a shape of the target object formed of the cube data, preserving a substantial shape of the target object formed of the cube data, preventing a substantial change of a total volume of the combined cube elements, preserving the total volume of the combined cube elements, and maintaining an aspect ratio of surfaces of each of composite cube elements created by combining the cube elements within a predetermined range.

Claims 4-8, which depend upon claim 1, single out the alternatives for the second condition. In other words, according to claim 1 the second condition is one of A, B, C, D and E, while claim 4 that specifies the second condition is A, claim 5 specifies that the second condition is B, etc. Applicants respectfully submit that each of the claims 4-8 may not be infringed while independent claim 1 is infringed. That is, for example, if an infringing method has the second condition A, claims 5-8 are not infringed, while claim 1 is infringed. Therefore, dependent claims 4-8 are narrower than independent claim 1 satisfying the requirement of 37 C.F.R. 1.75(c) to "further [limit] another claim or claims in the same application."

CLAIM REJECTIONS UNDER 35 U.S.C. §103

Claims 1 and 3-15 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent Application Publication No. 2002/0198693 by Marusich (hereinafter "Marusich").

Marusich is directed to a method of three-dimensional modeling of deformation in a body using finite element analysis. The computational modeling element is a first-order parent tetrahedron having four corner nodes at the corners of the tetrahedron and an additional node that defines a number of sub-elements within the first-order tetrahedron. That is, all the teachings of Marusich are directed to the use of tetrahedrons as mesh elements and not "mesh data obtained by dividing the target object by the [orthogonal] grid lines." Indeed, the Background section of Marusich, besides introducing the Finite Elements Analysis (FEA) technique⁴, suggests that FEA technique may be applied to cube elements in three dimensional

⁴ See paragraph [0004] of Marusich, "A common technique in computational modeling of components or workpieces is Finite Element Analysis (FEA). [...] [The] component or workpiece [is divided] into a mesh of small, discrete elements [...] [which] breaks the simulation problem down into a number of individual problems that can be solved using basic physics concepts. FEA allows the user to simulate larger, more complex behavior [...] by combining the results from each element [...] into [...] a global solution [...]."

problems, in paragraph [0005]. However, Applicants respectfully note that none of the teachings in Marusich is actually applied using cubes as elementary elements because rectangular elementary elements cannot be preserved in case of deformation. According to MPEP 2143.01V, the proposed modification of the prior art teachings cannot render the prior art unsatisfactory for its intended purpose⁵. Here, replacing the tetrahedron shapes in the method of modeling deformation of Marusich with cubes would render the method ineffective because the cubes are not preserved in case of deformation. Therefore, Applicants respectfully traverse the obviousness rejections based on Marusich.

Additionally, Applicants respectfully submit that Marusich does not teach or suggest the five alternatives of the second condition as recited in claim 1 (already cited above “reducing... within a predetermined range”).

Therefore, Applicants respectfully submit that independent claim 1 and claims 4-10 depending therefrom are patentable.

Based on the arguments presented above relative to claim 1,

- claims 11 and 12 are patentable at least by reciting

forming grid lines orthogonally crossing each other over a target object;

forming cube data from mesh data obtained by dividing the target object by the grid lines, the cube data being formed of cube elements that are mesh elements forming the target object; and

reducing the cube elements in number by combining the cube elements in accordance with a predetermined condition selected from a group of predetermined conditions consisting of preventing a change of a shape of the target object formed of the cube data, preserving a substantial shape of the target object formed of the cube data, preventing a substantial change of a total volume of the combined cube elements, preserving the total volume of the combined cube elements, and maintaining an aspect ratio of surfaces of each of composite cube elements created by combining the cube elements within a predetermined range;

- claim 13 is patentable at least by reciting

a setting part forming grid lines orthogonally crossing each other over a target object;

a calculation part obtaining cube data from mesh data obtained by dividing the target object by the grid lines, the cube data being

⁵ If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)

formed of cube elements that are mesh elements forming the target object; and

a combining part combining the cube elements of the cube data in accordance with a predetermined condition selected from a group of predetermined conditions consisting of preventing a change of a shape of the target object formed of the cube data, preserving a substantial shape of the target object formed of the cube data, preventing a substantial change of a total volume of the combined cube elements, preserving the total volume of the combined cube elements, and maintaining an aspect ratio of surfaces of each of composite cube elements created by combining the cube elements within a predetermined range;

claim 14 is patentable at least because it recites

dividing a target object into a plurality of first elements using an orthogonal grid, each first element corresponding to first data;

and claim 15 is patentable because it recites

forming grid lines orthogonally crossing each other over a target object;

forming cube data from mesh data obtained by dividing the target object by the grid lines, the cube data being formed of cube elements that are mesh elements forming the target object; and

reducing the cube elements in number by combining the cube elements in accordance with a predetermined condition.

The above indicated features of claims 11-15 are not taught or suggested in a manner consistent with the 35 U.S.C. 103(a) by Marusich.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

Serial No. 10/647,250

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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